Proc. R. Coll. Physicians Edinb. 1997; **27**: 258-262

Book of the Quarter

BUT IS IT TRUE? A CITIZEN'S GUIDE TO ENVIRONMENTAL HEALTH AND SAFETY ISSUES

Aaron Wildavsky, Harvard University Press, 1995, pp 574

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In the October 1996 issue of this journal, Professor Donald Weir wrote a masterly and thought-provoking review of Garrett's book, *The Coming Plague*. That book demonstrates in dramatic terms the need to have considerable respect for our fellow inhabitants of this planet, the micro-organisms. A generation has now grown middle aged since the discovery of antibiotics and the widespread use of vaccination worldwide, and that generation now dominates the political and scientific establishment. The points Garrett makes echo the warnings in the works of René Dubos's *The Mirage of Health* and Zinsser's *Rats, Lice and History*, that I read in the 1950s as a medical student, warnings that have not been heeded. *But Is It True?* is a book that puts the argument for *laissez faire* with respect to governmental response to scientific warnings, and might be regarded as a partial antidote to the admonition found in *The Coming Plague*.

Aaron Wildavsky was professor of political science and public policy at the University of Berkeley, California, and a self-confessed lifelong political activist of the right; this book was his last work. It addresses the interfaces between science, the media and policy-making in the North American context, and it does so in an unusual and stimulating way.

From my personal experience, I have chosen three examples of the processes dissected in this book, two relating to the differences between the United States and the United Kingdom, and one to media reporting of environmental issues. In 1970, the Edinburgh Institute of Occupational Medicine completed analyses of the relationships between exposure of coal miners to dust and their risks of pneumoconiosis. These data were used by both UK and US governments in setting dust standards in coal mines. The UK chose a figure of 8.0mg/m^3, while the US decided on 1.0mg/m^3. The difference reflected different attitudes to health and safety: the UK opted, after discussion with management and trade unions, for a practicable standard as part of an overall programme of reducing dust levels while ensuring continued productivity and employment, while the US chose a threshold figure at which pneumoconiosis would apparently be very unlikely to occur. This was at a time when a great deal of public sympathy for American coal miners had been generated following a tragic underground explosion in West Virginia, and was coupled with the passage through Congress of a Bill for compensation of miners for disability attributable to pneumoconiosis. To an outsider, the political interest in the health of miners was remarkable, but even more remarkable was the unpleasantness and bitterness that accompanied the process of assessing disability, and the opportunities this provided for less scrupulous doctors and lawyers to enrich

themselves. This was my first experience of the adversarial, rather than consensual, method of arriving at any decision that is perhaps the norm in the United States.

By the late 1970s, it had become apparent that exposure to asbestos implied a greater threat to workers than had previously been appreciated, because of the relatively brief, though usually heavy, exposures required to cause mesothelioma. This caused widespread anxiety, and in particular it was put about that not only workers but also the general public were at risk of this disease. In spite of all the evidence that the intensity of exposure was the important factor, moves were made to deal with asbestos in public buildings in case trace amounts in the air might harm people working in them. In the UK, a pragmatic view was taken that sealed asbestos was not going to harm anyone unless it was disturbed, and in general the material was left *in situ* and sealed in. In contrast, in the US it became almost impossible to sell or insure a building if asbestos was known to be in it, and a Bill passed through Congress requiring all asbestos to be removed from schools lest children develop mesothelioma. A large asbestos removal industry built up and flourished, and school boards faced bankruptcy. I believe that I was one of the first people to point out, at a meeting in California, that this policy of removing asbestos from buildings was likely to increase the overall public health risk, since asbestos *in situ* is safe (some might say, in terms of fire prevention, life-saving) while its removal causes real and quantifiable risks to the workers involved in stripping it out, in its subsequent transportation and disposal, as well as leaving higher airborne concentrations in the building after removal.

Both of these examples have led to very large litigation industries, and it may fairly be said that the primary beneficiaries of the recent pressure in the US to improve the safety of workers have been lawyers.

Currently, the UK is seeing an upsurge of popular interest in air pollution, based on studies which have shown small, but statistically significant, effects on health at the levels of concentrations occurring in our cities nowadays. The newspapers commonly report the unsubstantiated claims of environmental groups to the effect that thousands of deaths are occurring annually as a direct result of air pollution in British (or even Scottish) cities, without drawing attention to the fact that concentrations of the dangerous pollutants are now some ten times lower than they were a couple of decades ago. They emphasise the harmfulness of concentrations of nitrogen dioxide in the streets without pointing out that levels often an order of magnitude higher may occur in kitchens when a gas cooker is in use, without causing obvious harm. Where there is uncertainty, there are two sides to an argument, and the media do an obvious disservice to intelligent readers by reporting only one.

It is popularly believed on both sides of the Atlantic that the setting of standards to protect the health of the public is firmly based in science. This is only partly true, the process being both more complex and less sophisticated. Two sciences are involved: epidemiology and toxicology. Epidemiology in this context involves the study of exposed and control human populations, and at its most useful is able to derive exposure-response relationships that point to a concentration (threshold) at which harm will not occur. Unfortunately this ideal is almost never possible, since such studies investigate the effects of relatively high exposures and then have to extrapolate downwards to low exposures, making assumptions as to the shape of the curve describing the relationship. Moreover, estimation of exposure (or dose) in epidemiology is usually just that, estimation based on a minimum of actual measurement. With respect to carcinogens, it is usual for the extrapolation to be

taken through zero, on the dubious assumption that no dose of a carcinogen, however small, is safe, the 'one hit theory'. This leads to the impossibility of defining a threshold and to the process of calculating a 'quantitative risk assessment' that indicates the concentration at which the excess risk of cancer is, say, one in a million. While such a term implies a highly scientific process, in fact it is little better than an educated guess cloaked in statistical jargon, the result being critically dependent on the statistical model used. Only when epidemiology aims to guide the setting of a standard to protect a workforce, and is based on studies carried out on that workforce at the sorts of concentrations to which they are exposed is it able to propose a threshold level with reasonable confidence. With respect to the much lower concentrations to which the general public may be exposed, there must be a leap from the known to the unknown that is based on judgement rather than on science.

Toxicology may also come close to the detection of a threshold when studies are made (as they often have been, for example, on toxic gases such as ozone) of the effects on human volunteers with and without respiratory illness. However, in the case of carcinogens, such studies are clearly not possible and animals are used as a surrogate. While this is appropriate to investigate mechanisms of carcinogenesis, it is widely used, *faute de mieux*, in standard setting in order to extrapolate to qualitative and even quantitative effects on humans. In the United States there is a law that if a chemical has been shown to cause cancer in any animal study, it should also be treated as a human carcinogen; this is one of the author's main targets in this book. In view of the very different responses between species to many toxic substances and the propensity of mice to get tumours whatever you do or do not do to them, toxicology also requires an act of faith in moving to predict effects on humans from the effects on animals. Of course, the closer the experimental animal is phylogenetically to the human, the more likely are the responses to be similar, but this raises important problems in terms both of ethics and practicality. In parenthesis, it is joked in the US in this context that the perfect experimental animals would be lawyers, because they are close to being human, there are plenty of them, it is very difficult to get to like them, and nobody protests if you cause them suffering. This would not of course apply in Edinburgh!

What then is this book about? It is a highly sceptical assessment by a social scientist and his undergraduate students of the science behind important policy decisions relating to public health and safety, primarily in the US. These range from the great cranberry scare, when Congress regulated the amount of pesticide that could contaminate cranberries on account of its carcinogenicity in mice (and almost put the industry out of business), through alar on apples, asbestos in schools, DDT and agent orange, to the ozone hole, CFCs and, not to be deterred by really big issues, to global warming. In all these cases, the author, aided by the researches of his students, detects the gap between scientific evidence and policy decision, and shows how either uncomprehending or frankly biased media reporting, often manipulated by pressure groups, has led, in his view, to excessive regulation. In the author's final chapters, literally his last since he died of lung cancer while revising the book, he points out that the economic consequences of excessive regulation may themselves have adverse effects on the health of populations through causing unemployment and poverty.

The book reflects the adversarial culture that characterises life in the United States, and had the author lived and worked in Britain he would probably have found other targets at which to direct his fire. By and large, I found myself agreeing with

him with respect to regulation of putative carcinogens, but I think I understand why the US system tends towards over-regulation. There has in that country been a long tradition of industry exploiting its workers, owing to a serious lack of effective workplace regulation. This was the case in Britain during the Industrial Revolution, but our reaction to it started early and we have built up a reasonably effective and, at least until very recently, generally enforced body of health and safety law. It has largely been the role of the environmental movement in the United States to put the brakes on unregulated free enterprise, and the techniques that they have used have sometimes appeared to be as unscrupulous as those of the entrepreneurs. One way of putting pressure on industry is to imply that it is harming not only its employees but also the general public. While this book is a useful and effective demonstration of how far the pendulum has swung, writing as someone who sees something of the human misery that may be caused by careless or thoughtless industrial activity, I would not find myself lining up with the author politically as he calls for deregulation.

Aside from being a counterblast to over-regulation, the book has the stated motive of being a citizen's guide to health and safety issues. The author believed, and thought he had demonstrated this by using his non-scientifically trained undergraduate students as researchers, that intelligent citizens can, by reading the original literature, understand the flaws and gaps in the scientific arguments that lead to regulation. He outlines a method by which this may be achieved. There are however some obvious difficulties - this process must take more time than the average citizen has available, and the complexity of the evidence may be too much for the non-scientifically trained to digest and absorb. Think, for example, of the literature on global warming (or, as he points out, the immediately preceding fears of a second ice age, also apparently requiring the same solution). It seems unlikely that most of us could come to a conclusion as to which way the evidence points without packing in our day jobs. To be fair, this is partly the author's point; there is insufficient evidence one way or the other for major policy decisions, and the principle of acting just in case, the precautionary principle, is wasteful and may even be harmful to mankind. However, the issues of global warming and of ozone depletion seem to me to have been poorly dealt with and very important issues missed as a result of the author's approach, leading to an unjustified complacency. Well, it depends where you are; for a worker in industry exposed to a potential carcinogen, the precautionary principle may be something to welcome. To a taxpayer or industrialist, regulation has cost implications. The application of the precautionary principle requires a modicum of common sense in interpreting the cost-benefit analyses.

To me there is a practicable alternative - that those independent scientists (and economists) responsible for giving advice to governments should provide justification for that advice in short documents written specifically to be understood by the intelligent lay person. This method, currently used in the UK with respect to air quality standards, should inform the public and our political representatives not only of the science but also of the uncertainties and assumptions in coming to a recommendation. How helpful it would have been to have had such a document on BSE and Creutzfeldt-Jakob disease.

Man's interaction with the environment is the cause of nearly all the change in disease patterns, a fact that is not intuitively obvious to many medical researchers. In terms of human survival, it is probably the one key area, since in what is likely

ultimately to be our losing battle with the micro-organisms new drugs are doomed only to buy time. Our single advantage is scientific ingenuity which allows us to adapt our environment rather than have to wait for genetic change. Shortly after receiving this book from the editor, I received a copy of our Government's consultative document on the environment as a key area in the 'Health of the Nation' policy. I opened it with some interest and was pleased to note that it does take account of carbon dioxide build-up and the greenhouse effect, but it continues to omit any reference to infectious disease. I wonder why not.

There is much to stimulate thought in this book and it is, in spite of the apparent complexity of its subject matter, easy to read. It is not in my view always right but should open many eyes, cause all of us to think more critically about scientific evidence, and may even provoke some people to fury. It provides a desirable antidote to the more extreme statements and claims of the environmental lobby, and is just what is needed to maintain brain activity during a summer holiday, for which purposes, I recommend it to the readers of this journal.

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Ornamental sundial, Lennoxlove House, East Lothian
(Photograph by David H. A. Boyd)